ENVIRONMENTAL IMPACTS OF SHALE GAS DEVELOPMENT

CALGARY, April 18-19, 2013

The University Consortium is organizing and sponsoring a Special Focus Meeting on the environmental aspects of shale gas development (SGD) ***with emphasis on actual and potential subsurface impacts***. This meeting, which is by invitation only with a limit of 75 attendees, will be held on the University of Calgary campus, Calgary, Alberta, April 18-19, 2013 with facilitation by the University of Calgary. Rooms at Hotel Alma are being reserved for all.

Meeting Purpose and Scope

SGD by hydraulic fracturing has become over a short period a major source of natural gas in North America; however there has not been a corresponding effort directed at identifying and assessing all of the potential environmental impacts and therefore there is much controversy and debate within a current framework of limited monitoring and research. The purpose of this meeting is to clarify what is known and not known about several of the potential impacts. At this meeting the environmental aspects of SGD will be examined and debated with emphasis on known and potential subsurface impacts in the context of scientific hypotheses, evidence and process-related understanding. This meeting will consider various aspects including gas leakage due to inadequate cement seals of wells, impacts of gas leakage on groundwater quality, subsurface system characterization and monitoring, both performance monitoring and long term impacts monitoring, seismicity and earthquakes, deep well injection of flow back liquids and recent advances in hydraulic fracturing technologies to minimize environmental impacts.

Background

The University Consortium for Field-Focused Groundwater Contamination Research was established in 1988 as a framework for academic research involving Canadian and American universities with funding from industry and government directed at groundwater problems of interest to industry and society at large. The Consortium has eight universities as primary members, four in Canada and four in USA and twelve corporate sponsors. One of the functions of this Consortium is to organize and sponsor a two day annual meeting attended by 40- 70 people. These Consortium meetings are known as 'Focus Meetings', which are directed at a topic of mutual interest to industry and academia. The purpose of these Focus Meetings is to bring together invited representatives from academia, industry, the consulting community and government to examine and debate the selected topic. These meetings are normally held in Denver in October, however, this upcoming meeting concerning shale gas will be held in Calgary in April as a special meeting of the Consortium. This special meeting is being arranged because of the particular urgency associated with environmental issues related to shale gas development in Canada and the USA and the continuing uncertainties and knowledge gaps.

Format:

The number of attendees will be limited to about 60-70 and by invitation only. In the spirit of encouraging open discussion, debate and deep probing into the scientific and technical issues, there will be no formal note taking, no report produced from the meeting and all PowerPoint presentations will be considered the sole property of the presenters and will not be kept as a record of the meeting without written permission of the presenters. There will be many short presentations with substantial time available for discussion. As with prior Consortium Focus Meetings, speakers will include leading academic researchers, remedy implementers, and industry researchers. The first day of the meeting will involve presentations and discussions. The second day will focus on summarizing key issues and identifying research needs.

Program Committee:

John Cherry, Director, University Consortium; Beth Parker, G360, University of Guelph; Maurice Dusseault, University of Waterloo, Cathy Ryan, University of Calgary and program communications manager, Dick Jackson, Geofirma Engineering [phone 519.699.4657; email: rjackson@geofirma.com].

The Program (Draft)

The program for this meeting, outlined below, is still preliminary. It will undergo revision in the next few weeks. The meeting will have top-level speakers and other attendees selected to make sure that we will have in the meeting room the best group of scientists and engineers to examine the important issues concerning the subsurface environmental aspects of shale gas development.

Session 1: The Problem (Chair, John Cherry)

- Introduction [Steve Moran, AGS Retired]
- Natural gas geology [Sally Sutton, CSU Fort Collins]
- The idea of a social license for technology [To be announced]
- Groundwater contamination [Tony Gorody, Houston]
- The long-term well integrity issue [Maurice Dusseault, uWaterloo]
- Discussion

Session 2: Status of unconventional gas development (Chair, Beth Parker)

- 30 years of shale gas fracturing: what have we learned? [George King*, Apache]
- Mathematical models in hydraulic fracturing design [John McLennan, uUtah]
- Microseismic monitoring [Dave Eaton*, uCalgary with Mirko van der Baan*, uAlberta]
- Water use in fracturing operations in northeastern BC [Elizabeth Johnson*, BC Energy]
- Discussion

Session 3: Industrial & regulatory efforts to make shale gas development safe (Chair, Steve Moran)

- Shell's design and monitoring protocol for hydraulic fracture stimulation in the Groundbirch [Manuel Willemse*, Shell Canada]
- SLB* on testing zonal isolation with cement logging tools

- ERCB's draft directive on hydraulic fracturing and forensic investigation of the Caltex and Midway events [Bob Willard* with George Eynon* and Theresa Watson*, ERCB]
- Québec's investigations into fracking safety, well integrity and current field work [René Lefebvre, INRS, uQuébec with Christine Rivard, GSC]
- The Pavillion, Wyoming dispute [Curt Stanley, Shell Global]
- Groundwater quality assessment, Marcellus shale region [Don Siegel, uSyracuse; Bert Smith, Chesapeake]
- Discussion

Session 4: Characterization & Monitoring (Chair, René Lefebvre)

- Developing a groundwater monitoring program for Alberta [Bernhard Mayer, uCalgary]
- Use of stable isotopes to fingerprint gas releases from leaky wells [Karlis Muehlenbachs, uAlberta]
- Understanding gas contamination of a buried valley aquifer [Dale Van Stempvoort, Environment Canada]
- Total dissolved gas pressure as a master variable for gas-rich groundwater quality [Cathy Ryan, uCalgary]
- Developing groundwater monitoring profiles for contaminants in fractured rock [Beth Parker, uGuelph]
- Discussion

Session 5: Seismicity, Earthquakes and Faults (Chair, Les Smith*, UBC)

- Introduction [Craig Cipolla*, Hess Energy]
- Pore-pressure transmission in active faults [Emily Brodsky, UC Santa Cruz]
- The fracture and fault systems along the Rocky Mtn foothills [Steve Grasby, GSC Calgary]
- Soil gas sampling of the Clarendon Linden fault zone [John Fountain, NC State]
- Discussion

Session 6: Gaps in Understanding and Research Needs (Chair, John Cherry)

- the US research program into subsurface environmental effects [Dan Soeder*, DOE NETL]
- the absence of hydrogeological research & field experiments [Dick Jackson, Geofirma]
- the absence of geomechanical research into the long-term well integrity problem [Maurice Dusseault, uWaterloo]
- research programs in CO2 geological sequestration and what they teach us [Rick Chalaturnyk*, uAlberta]
- Discussion
- wrap up [John Cherry, University Consortium]

***invited and as yet unconfirmed**